COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

D.T.E. NO. 01-20

RECORD REQUEST: Department of Telecommunications and Energy to AT&T Communications of New England, Inc.

DATE: January 31, 2002

RR-DTE-59 Where specific inputs are not provided, use the default (i.e., as proposed) values in the respective models. If any assumptions need to be made, record and report them. Provide three results for statewide average 2-wire analog loops: (1) as proposed; (2) for Scenario A; and (3) for Scenario B. Verizon: Also provide results that correspond with Part B-1 Unbundled Loop Summary, the page entitled "Massachusetts Monthly Cost Summary"; line 1 (2-wire analog GR-303) and line 2 (2-wire analog TR 008). In all instances, only provide statewide average results.

(a) Scenario A:

Debt/Equity Ratio: 25%/75%
Cost of Debt: 7.55%
Cost of Equity: 14.28%
Depreciation: Verizon proposed
Cable fill (sizing) factor
- Distribution: 40.5%
- Copper feeder: 55.2%
- Fiber Feeder: 60%

Copper/fiber mix in feeder:
- Assume 100% fiber feeder (set threshold to 0 statewide)
- 100% IDLC (Optional: also provide the results assuming 31.25%/68.75%)

Scenario B:

Debt/Equity Ratio: 34.5%/65.5%
Cost of Debt: 7.8%
Cost of Equity: 10.42%
Depreciation: DTE-Ordered in Consol arb.
Cable fill (sizing) factor
- Distribution: 64%
- Copper feeder: 80%
- Fiber Feeder: 100%

Copper/fiber mix in feeder:
Assume 100% fiber feeder (set threshold to 0)
100% IDLC

Respondents: Robert A. Mercer
John C. Donovan

RESPONSE:

(Mercer)

The following table presents the statewide average monthly loop cost for two-wire analog loops under each of the three conditions defined in the record request:

1) as proposed in the current model output;

2) with the Scenario A input values specified in the record request (with the model's nominal values used for all other inputs); and

3) with the Scenario B input values specified in the record request (with the model's nominal values used for all other inputs.)

The Scenario A output is further broken into two parts:

a) 100% IDLC; and

b) 31.25% IDLC and 68.75% UDLC.

All of the Scenario A and Scenario B results are based on the assumption of 100% fiber feeder, as specified in the record request, which is achieved by setting the High Density DLC Copper Feeder Max Distance to 0 ft in those runs.

Scenario	Monthly Cost
Current Proposal	$ 7.09
Scenario A a) 100% IDLC b) 31.25% IDLC/ 68.75% UDLC	 $11.19 $12.72
Scenario B	$ 8.52

The Scenario Inputs worksheets for the model runs required to produce the results other than the current proposal[1] are included as Attachment 1. Most of the changes required to achieve the inputs specified in the Request are straightforward. The following notes on two special considerations pertain to the run of Scenario A which assumes a mix of IDLC and UDLC.

First, the current version of HM 5.2a-MA does not specify the investments for UDLC. Therefore, Mr. Donovan has developed inputs values for those investments based on his experience with such equipment. The rationale and assumptions underlying the weighted IDLC/UDLC investments used in the model run are presented below, and the associated spread sheets that develop the investments are included as Attachments 2 and 3.

Second, it was necessary to adjust the analog line offset to reflect the fact that no switch investment offset should be claimed for lines served by UDLC, since such lines appear at the switch as two-wire analog loops. The model calculates the amount of per-line switch investment offset by IDLC loops as follows:

Per-line offset = $30 * (Percent IDLC lines – 18.3%).

where $30 is a user input to the model referred to as the Analog Line Circuit Offset for DLC lines. This formula reflects AT&T's position that $30 is the amount of per-line switch investment saved through the use of an IDLC switch interface, and that 18.3% is the approximate percentage of IDLC lines that are already reflected in the switch prices adopted by the FCC. Therefore, since 31.25% of the lines in the mixed IDLC/UDLC scenario are IDLC lines, the model should calculate the per-line offset as:

[1] Since the model as submitted is programmed with the appropriate nominal values for Massachusetts, no input changes are required to reproduce the current proposal.

Per-line offset = $30 * (.3125 - .183) = $3.88.

However, since the model is not designed to recognize the distinction between IDLC and UDLC loops, it looks only at the total percent of DLC loops produced by the model, which, as mandated by the Request, has been forced to 100%. As a result, barring a change to the Analog Line Circuit Offset for DLC lines input value, the model would calculate the per-line offset as:

Per-line offset = $30 * (1 - .183) = $24.51, which is too high.

Rather than changing the model to recognize a difference between UDLC and IDLC lines, the $30 Analog Line Circuit Offset for DLC lines input value has been reset to $4.75, so the model calculates the per-line offset as

Per-line offset = $4.75 * (1 - .183) = $3.88, which is the desired result.

(Donovan)

Investments in Universal Digital Loop Carrier ("UDLC") Versus Integrated Digital Loop Carrier in Next Generation Digital Loop Carrier ("NGDLC") Systems

In general, the major investment differences between a UDLC and an IDLC system are that line cards are doubled, along with the associated need for Channel Bank Assemblies to house those extra line cards now required in the central office, plus the $30.00 per line savings for the "Analog Line Circuit Offset for DLC Lines" is eliminated since cabling to the MDF plus terminations and protectors are now required. There is a very small reduction caused by eliminating DS-1 terminations and cross connections used to connect the central office terminal at the digital DS-1 level. For Low Density systems, a significant additional investment is also incurred because the ability of a low density central office Host Digital Terminal to host multiple Remote Terminal sites is eliminated. Overall investments for a fully loaded 672-line system, including line cards, MDF terminations, and Analog Line Ports increase from $97,920 to $175,760 ($145.71 per line to $261.55 per line). For a fully loaded 120-line system, investments increase from $24,400 to $47,200 ($203.33 per line to $393.33 per line). It should be noted that for any mix of IDLC and UDLC within a High Density NGDLC System, the extra investments required for any UDLC portion of the installation are discrete and may be segregated away from IDLC costs. In other words, extra costs for UDLC can be attributed to UDLC services, thereby allowing IDLC costs to stand on their own. Details are as follows.

High Density NGDLC Systems

Central Office Common Equipment:

A UDLC system eliminates the need for $500 in DS-1 Shelf Commons, $800 in DSX-1 & Cabling costs, and the associated $55 (1 hour) to Splice DSX Metallic Cable plus $28 (1/2 hour to place DSX Cross Connections).

A 672-line UDLC system requires three Channel Bank Assemblies at a cost of $4,000 and Channel Bank Commons at a cost of $2,500 (using the same costs as indicated in the IDLC system cost for Channel Bank Assemblies used in the Remote Terminal). Labor to attach the Channel Bank Assemblies to existing central office frames and to insert the Common Cards is estimated at 9 hours, based on engineering experience.

The engineering and placing of central office racks have already been captured in the IDLC system's initial installation, so no incremental costs for those functions are required for a UDLC system.

Since the UDLC system produces copper-based DS-0 signals, DS-0 Cabling, MDF Terminations and Protectors, and associated labor to Place DS-0 Cabling and Terminating DS-0 Cabling are also required. Those costs have been captured in the Central Office Costs. However, in an IDLC configuration, the HAI Model reduces central office costs via the Analog Line Circuit Offset for DLC Lines of $30.00 per line. That offset should be proportionately reduced by the percentage of UDLC lines to total DLC lines. For example, if the percentage of IDLC lines to total DLC lines is 31.25%, then the $30.00 offset should be reduced to 31.25% of $30.00, or $9.38.

Central Office Channel Unit Line Cards:

IDLC systems do not requires Central Office Terminal Line Cards for each DS-0 circuit, but UDLC systems do require lines cards to match those deployed in the Remote Terminal. Therefore, Line Card Costs should be doubled for the percentage of UDLC lines served.

Remote Terminal Costs:

There is no change in Remote Terminal Costs.

High Density NGDLC 672-Line Increment

The HAI Model allows for up to two incremental additions of 672-line increments to bring total capacity up to a maximum of 2016 lines. In an IDLC system, these increments do not require any additional engineering or placement of frames and racks because such expansion is readily incorporated into the existing rack space created for the IDLC central office common equipment. However, since a UDLC system requires the placement of additional frames and racks for the addition of Channel Bank Assemblies, an additional 6.0 hours ($330) of engineering and 3.0 hours ($165) of labor are required to engineer and install this extra equipment, based on engineering experience.

Additional equipment consists of three Channel Bank Assemblies ($4,000), Channel Bank Assembly Commons ($2,500), and associated Place Channel Bank Assemblies labor (9.0 hours = $495), as discussed in the initial increment of central office equipment for those same items.

Low Density NGDLC DLC Systems

Central Office Common Equipment:

A UDLC system eliminates the need for $800 in DSX-1 & Cabling costs, and the associated $55 to Splice DSX Metallic Cable plus the $28 to DSX Cross Connections.

A 120-line UDLC system requires one small Channel Bank Assembly at a cost of $1,000 and Channel Bank Commons at a cost of $2,200 (based on engineering experience). Labor to attach the Channel Bank Assemblies to existing central office frames, and to insert the Common Cards is estimated at 3 hours ($165), based on engineering experience.

The engineering and placing of central office racks have already been captured in the IDLC system's initial installation, so no incremental costs for those functions are required for a UDLC system.

Since the UDLC system produces copper-based DS-0 signals, DS-0 Cabling, MDF Terminations and Protectors, and associated labor to Place DS-0 Cabling and Terminating DS-0 Cabling are also required. Those costs have been captured in the Central Office Costs. However, in an IDLC configuration, the HAI Model reduces central office costs via the Analog Line Circuit Offset for DLC Lines of $30.00 per line. That offset should be proportionately reduced by the percentage of UDLC lines to total DLC lines. For example, if the percentage of IDLC lines to total DLC lines is 31.25%, then the $30.00 offset should be reduced to 31.25% of $30.00, or $9.38.

Allocation of Host Digital Terminal Investment:

In an IDLC configuration, the HAI Model assumes that the Host Digital Terminal can supply central office termination for up to 672 lines of Remote Terminal sites. The HAI Model reduces that hosting capability via a 75% fill factor, resulting in an allocation of Host Digital Terminal investment per Remote Terminal site of 23.81%. Use of UDLC precludes the advantage of hosting multiple Remote Terminal sites, so that percentage should be increased from 23.81% to 100% to reflect no multi-hosting capabilities. Changing that factor increases equipment costs of $1,191 to $7,400 plus labor costs of $286 to $1,300 per Remote Terminal installation.

Central Office Channel Unit Line Cards:

IDLC systems do not requires Central Office Terminal Line Cards for each DS-0 circuit, but UDLC systems do require lines cards to match those deployed in the Remote Terminal. Therefore, Line Card Costs should be doubled for the percentage of UDLC lines served.

Remote Terminal Costs:

There is no change in Remote Terminal Costs.

Low Density NGDLC 120-Line Increment

The HAI Model allows for one incremental addition of a 120-line increment to bring total capacity up to a maximum of 240 lines. In both IDLC and UDLC configurations, the central office equipment, engineering and labor are the same as for the initial increment (albeit different for IDLC vs. UDLC), with the exception that additional SONET Transceivers are not required because the original fibers are still being used.